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—BY—

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UNIVERSITY OF WISCONSIN.

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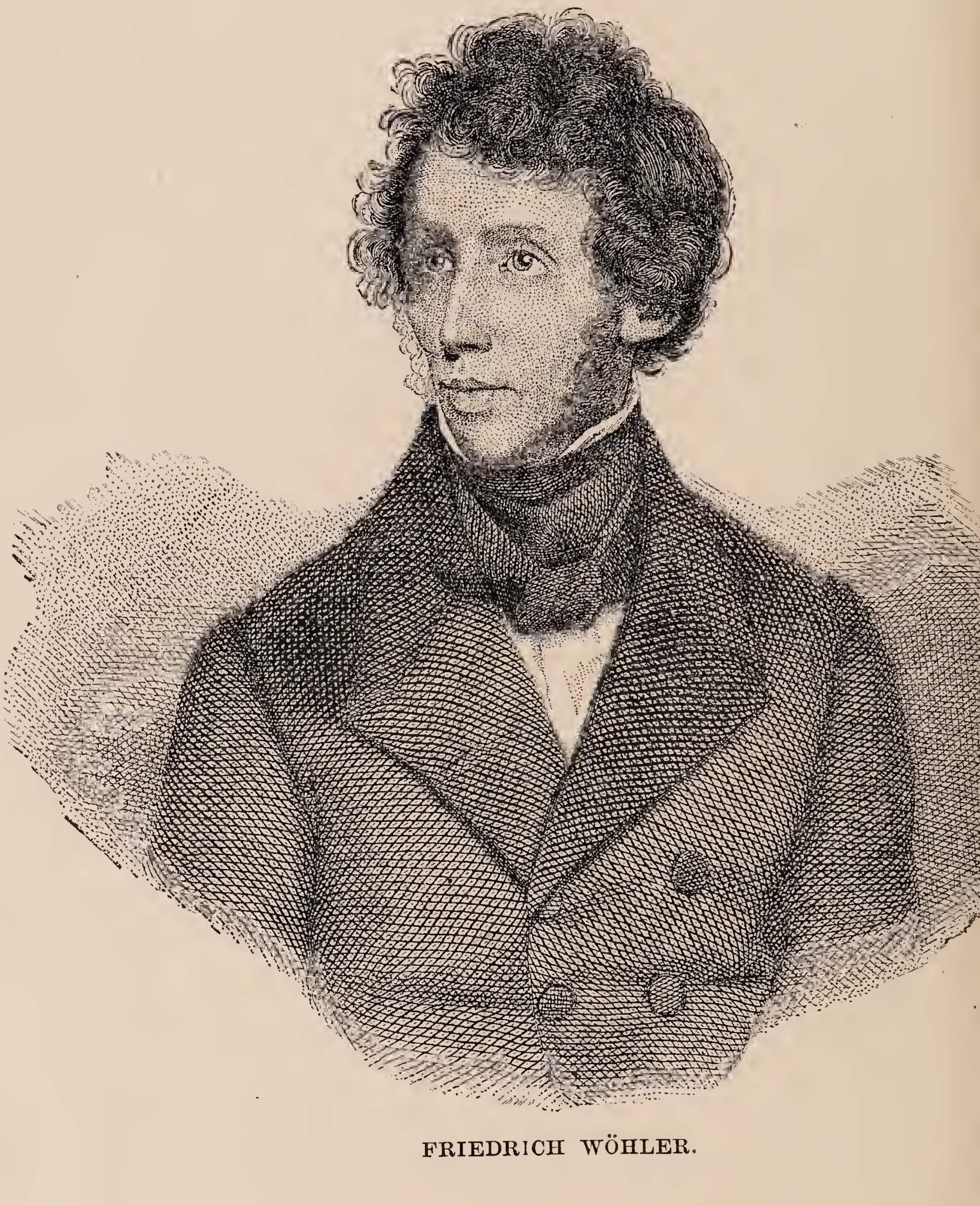

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In the extensive fields of current literature there is probably no department, which, to the intelligent and thoughtful reader, combines more of interest than the lives of those who have risen to eminence, or who have acquired distinction above their fellows by virtue of special achievements. By the study of such lives and their environments we frequently find reflected the history of the times which produced them, and from them may often be derived many valuable lessons of character, as well as incentives to efforts which leave their impress, in ever widening circles, upon succeeding generations.

Among those whose names in the present century have shone most brightly in the scientific firmament, that of the subject of this sketch will always be associated. It is desired, therefore, at this time to briefly delineate some of the more prominent steps in the life of him whose career has been so illustrious, and whose name can never require a more enduring monument for its perpetuation than is afforded by the annals and history of that science for which he so long and so successfully labored.

In attempting such a presentation of the subject, the present writer has drawn largely for information from the very interesting and complete memoir prepared by Professor A. W. Hoffmann of the University of Berlin for the German Chemical Society, as also, to some extent, from the sketch given, before the death of Wöhler, by his intimate friend, Professor Charles A. Joy, in the Popular Science Monthly, in commemoration of the 80th anniversary of his birth.

Friedrich Wöhler was born July 31, 1800, in the village of Eschersheim, near Frankfort-on-the-Main, in the house of the village pastor, who was his uncle by marriage. How it occurred that his father was not at home at so important a period, is explained by the following amusing circumstance, which also serves to indicate the peculiar condition of society then existing in Germany. It was at a time when Wöhler's father held the position of equerry in the service of the Elector of Hesse-Cassel, Wilhelm II., a potentate of whom history does not give a very flattering picture, since his temper was violent beyond description. As the elector was one day visiting the royal stables, accompanied by the equerry, some slight occurrence excited his anger, which found expression in the use of very insulting language to his attendant. This so far exceeded the elder Wöhler's power of endurance that he seized a horsewhip and gave His Majesty such a flogging as he had undoubtedly often merited, but probably never before received. Having at once mounted the fleetest horse in the stables, the equerry was soon conveyed a safe distance from the impending wrath of his sovereign, who, however, apprehensive of ridicule, decided not to pursue the fugitive, and in fact allowed the entire occurrence to be forgotten. It became necessary, however, for the family to abandon their previous residence as speedily as possible, and the wife was so fortunate as to find the desired refuge in the house of her sister, where, as previously stated, the subject of this sketch was born. The parents subsequently purchased a small estate at Rödelheim, where they resided until 1812, when they returned to Frankfort.

Friedrich Wöhler received his first instruction in reading, writing and drawing from his father, when about seven years of age. He afterward entered the public school, and subsequently received private instruction in Latin and French, as also in music. All the accounts concerning his childhood bear testimony to a fondness for experimenting and for forming collections, such as is not infrequently observed in boys. In this case, however, these propensities were continually incited and encouraged, not only by his father, but also by a friend of the latter,—a gentleman who had spent some time at the University of Göttingen as a private tutor to some noblemen, and had especially interested himself in the physical sciences. The father, through his agricultural studies, had also become somewhat acquainted with the natural sciences, which he fostered to the best of his ability for the public good, while his friend possessed some physical and chemical apparatus, with which he allowed Wöhler himself to experiment.

In the year 1814 Friedrich Wöhler entered the Gymnasium (High School) at Frankfort, where he remained until fitted for the University. Among his teachers at that time were several who afterward became distinguished, such as Schlosser, the historian; Grotefend, the grammarian; Ritter, the geographer, and others, for all of whom he retained during his entire life a grateful remembrance. At the school he was regular in attendance, and became duly promoted in his classes, but, as he himself admitted, was not distinguished by extraordinary zeal or ability. This is considered to have been partially due to his passionate fondness for chemical experiments and for the collection of minerals, which often led him to neglect his school exercises. With several of his school companions he kept up a constant interchange of minerals, and afterward became acquainted with Menge, an enthusiastic collector and dealer in minerals, through whom, upon the occasion of a visit of the latter to Frankfort, he was introduced to the poet Goethe, who was likewise deeply interested in mineralogical studies.

A very important influence was brought to bear about this time upon the scientific career of Wöhler through Dr. Buch, a very intellectual and liberally educated man, who zealously pursued chemical, physical and mineralogical studies, and with whom he enjoyed several years of companionship. To this man he attributed his first true incentive to the earnest study of the natural sciences, and in the kitchen of his house, on certain days of the week, they performed mutual experiments.

Soon after the discovery of selenium he observed the presence of this then very rare element in fuming sulphuric acid, and afterward confirmed its presence in the pyrites from which it was prepared. These results were published in 1821, in Gilbert's "Annalen," and it was at the head of this short essay that the name of Friedrich Wöhler first appeared in print. The metal cadmium, which had also just been observed at that time, and which excited much attention, he likewise prepared in small amounts from zinc, and took his specimen to Göttingen to Professor Stromeyer, who confirmed its identity.

The young scientist now became constantly better acquainted with chemical processes, for while at first his experiments were confined to an old copy of Hagen's "Experimental Chemistry," which his father had used before him, and which was the only chemical work that he possessed, the rich library of Dr. Buch now stood at his command. Chemical experiments now became a passion with him, and completely absorbed his time. His room he gradually converted into a laboratory, full of glasses, retorts, flasks and minerals, all in the greatest confusion. Experiments requiring heat he made in the kitchen, where all the coal-hods were also brought into service. He also constructed a small voltaic pile out of large Russian copper coins and zinc plates, and observed its power of decomposing water, as also its action upon the muscles of the arm. For the reduction of potassium, however, this did not prove sufficiently powerful; but his desire to see and possess this wonderful metal was so great that he undertook its preparation by chemical means. Being familiar with the method of Curaudau, who, in 1808, had shown that the metal could be obtained by acting upon potassium hydrate with carbon, at a white heat, he made use as a furnace of a large, old graphite crucible, which had been given him by Bunsen, the master of the mint, and of a bellows which was loaned by the same person. With the assistance of his sister, who was required to blow the bellows, the experiment was finally successful beyond all expectations, and great was their pleasure as they saw the first shining globules of potassium make their appearance.

Many other things, moreover, interested and occupied the attention of the young chemist. He received instruction in drawing, an acquisition to which his father, who also drew well, attached much importance, and he frequently received the prizes of the school for his excellence in this art. Upon his excursions in the neighborhood and on the Rhine he always took his sketch-book with him, and drew from nature, and also even attempted painting in oil and etching, for which he received much encouragement from the painter Morgenstern. He also took much interest in antique coins, of which he had quite a collection, as also of Roman urns, lamps, and legion-stones, which at that time were frequently found in the old Roman encampments of the neighborhood, while with the poetical literature of his native land he likewise commenced to make himself better acquainted.

In the year 1820, or when about 20 years of age, Wöhler graduated from the Gymnasium, and entered the University. In accordance with his own inclination and with the counsel of his parents, as also from the fact that circumstances seemed especially favorable to his success, it was decided that he should study medicine. His first year of University life was spent at Marburg, where he zealously pursued the studies of mineralogy, botany, physics and anatomy. To the great vexation of his landlord he converted his room at Marburg into a laboratory, and commenced to experiment with sulpho-cyanogen and other cyanogen compounds. He also at this time discovered iodide of cyanogen, without being aware that Davy had previously prepared it. In his exultation he communicated his discovery to Wurzer, the Professor of Chemistry, to whom the discovery was evidently as new as to himself; but instead of receiving his commendation, as he had expected, he was reprimanded for giving his time to experiments, instead of confining himself to his medical studies.

Through the agency of his friend Dr. Buch, this investigation was published, in 1821, in Gilbert's Annalen, and from the description there given of the behavior of sulpho-cyanide of mercury upon heating, originated some decades later the popular chemical toy known as "Pharaoh's serpent."

At the expiration of one year at Marburg, Wöhler went to Heidelberg, having already become filled with enthusiasm for Leopold Gmelin, who afterward became his most cherished friend and counselor. His chief desire was to attend the chemical lectures of this eminent teacher, of whom a few years later the distinguished pharmacist and chemist, Friedrich Mohr, was also a pupil, but was advised by Gmelin that it was unnecessary, and would be a loss of time; and thus it happened, as seems very remarkable, that Wöhler had never heard any chemical lectures. He profited, however, so much the more through personal association with Gmelin, and by the opportunity of working in his laboratory. Although his medical studies now required most of his time, especially toward the close of the course, he still felt the necessity of spending several hours daily in the laboratory.

In September, 1823, Wöhler passed the university examinations, and received the degree of Doctor of Medicine and Surgery, with the insignia *cum laude*. It was subsequently his intention to travel, and especially to visit some of the larger hospitals of Europe, in order to better prepare himself for the practice of his profession; but at this juncture he was advised by Gmelin to follow his example, and, abandoning the practice of medicine, to devote himself solely to chemistry, for which he had already exhibited such remarkable talent. Acting upon the further advice of Gmelin, Wöhler applied to Berzelius, the eminent Swedish chemist, for permission to work in his laboratory, a request which at that time was granted to but a favored few. The answer which was given by Berzelius to the young student demonstrates clearly the noble elements of character which inspired both teacher and pupil. It was as follows:

"Any one who has studied chemistry under the direction of Leopold Gmelin has very little to learn from me; nevertheless I cannot forego the pleasure of making your personal acquaintance, and will therefore cheerfully accept you as the companion of my labors. You can come whenever it is agreeable to you. * * * * * * * *" This letter was introductory to a long and interesting correspondence, which was carried on until the death of Berzelius in 1848. It would seem worthy of note that the first scientific paper of Berzelius was published in the same year in which Wöhler was born. The journey to Sweden was at once undertaken, but neither time nor space will admit of reciting here the many incidents connected with his residence of nearly a year with Berzelius, which he has himself so graphically portrayed, and which he delighted to relate to his pupils in after years as one of the brightest periods in his history.

In September, 1824, Wöhler took leave of Berzelius and returned to the Continent, and as soon afterward decided to apply for the position of docent at the University of Heidelberg. While preparing to habilitate himself at the University he enjoyed the intimate friendship of Dr. Buch, and at this time also undertook the translation of Berzelius, "Jahresbericht," which Christian Gmelin, of Tübingen, Berzelius' first pupil, had transferred to him, as he was himself no longer able to continue it. It was while thus engaged in 1824, that Wöhler first made the acquaintanceof his life-long friend and co-laborer, Justus von Liebig. The meeting of these two men was at Frankfort, Liebig being at that time not yet twenty-one, and Wöhler only twenty-four years of age, yet they had both already become renowned for their important discoveries. The friendship which was then formed became only the more firmly cemented with each succeeding year, while the character of the accumulated correspondence which passed between them affords the best testimony of their mutual respect and affection.

In the winter of 1824–25, Wöhler's career took an unexpected turn, and instead of locating in Heidelberg he accepted the chair of chemistry in the newly founded "Gewerbeschule" at Berlin, for which position he had been recommended by Rose, Mitscherlich, and especially Leopold von Buch. The institution rapidly grew in importance, and in 1828,by royal decree, Wöhler was advanced to the rank of professor. His residence at the Prussian capital with the vast resources which were there at his command, as well as constant scientific intercourse with the favorite pupils of Berzelius—Mitscherlich, Heinrich and Gustavus Rose, Magnus and other most brilliant scientists of that day, could not have failed to exert an inspiring and most beneficial influence. None the less valuable or fortunate may be considered his personal acquaintance with Alexander von Humboldt, the privilege of listening to his intellectual conversation, and of attending his celebrated lectures on Cosmos.

This period, with consideration of the large number of valuable investigations which it includes-must be regarded as the most prolific of Wöhler's life, for at this time he not only published his famous researches on aluminium, beryllium, yttrium, and many others, but likewise, in 1828, made known the most important discovery of all—the artificial formation of urea, which caused such a wonderful revolution in the entire domain of chemistry.

In the year 1832, for domestic reasons, Wöhler was constrained to resign his professorship in Berlin, and remove to Cassel, where his wife's family resided. For some time thereafter he held no official position, and occupied himself chiefly with the translation of Berzelius' text-book of chemistry, spending some time also with Liebig at Giessen, where their important research on the oil of bitter almonds was completed.

While Wöhler was residing at Cassel a "Gewerbeschule" was founded there, similar to the one in Berlin. He was requested to aid in the organization of this new institution, and was likewise appointed to a professorship similar to the one he had previously held. In connection with these newly assumed duties, which required him to give considerable attention to technical chemistry, he made a journey to France and England in the autumn of 1833, in company with his friend Magnus, in order to visit laboratories and chemical works. On this tour he likewise had the opportunity of becoming personally acquainted with some of the most eminent living scientists of that period.

The year 1836 marks another very important epoch in Wöhler's career, by his appointment at the university of Göttingen as Professor of Chemistry and Pharmacy, Director of the chemical laboratories, and Inspector of the Pharmacies of the Kingdom of Hanover, in the place of Stromeyer, who had died the previous year. The position was first offered to Leopold Gmelin, then at Heidelberg, but as he refused it, the choice lay between Liebig and Wöhler, and was decided in favor of the latter. Wöhler's place at Cassel was subsequently supplied by Professor Robert Bunsen, then a docent at Göttingen, and at the present time the renowned and venerable teacher of chemistry at Heidelberg. The highest aim of Wöhler's ambition, to become a professor in a German university, was now realized, and although his request was granted to be made a member of the faculty of medicine, he could not succeed in liberating himself from the burdensome duties connected with the inspection of the pharmacies, which caused him much inconvenience and consumed much of his valuable time during a period of twelve years. As an example of his activity at this period, it may be mentioned that in every semester he delivered lectures upon general and organic chemistry, and during the summer lectured upon pharmacy from six to seven in the morning. In connection with this he had the direction of the already largely attended chemical laboratories, with but one assistant, Dr. Wiggers, who also assisted him in the inspection of the pharmacies. He was likewise one of the examiners in the medical and philosophical faculties, and frequently were added thereto the duties of dean of the faculty. Despite these numerous and varied demands upon his time, however, we find that he soon resumed his original investigations with remarkable energy, either alone or in association with his friend Liebig.

The long and distinguished career of Wöhler at Göttingen, covering a period of over forty years, and which was closed by his death, Sept. 23, 1882, was attended by many evidences of the highest honor and esteem, which found expression in the bestowal of many decorations, medals, diplomas and titles, as well as honorary memberships in numerous academies and learned societies in all parts of the civilized world.

He was the author of several standard works on chemistry, which have passed through many editions and been translated into several languages, while his original investigations, which were published chiefly in Gilbert's, Poggendorff's and Liebig's Annalen, are embodied in nearly three hundred papers.

In the brief sketch which has thus been given of a life so zealously devoted to the advancement of scientific truth, and which has served to stimulate so many of his pupils who have been guided by his teachings, and are now eminent men of science in many lands, we must still consider as of no less importance in their influence, those noble and exalted traits of personal character for which he was equally loved and revered.